

SCIENCE.

FRIDAY, JUNE 24, 1887.

COMMENT AND CRITICISM.

AN INTERESTING CASE of the failure of heredity is shown in the Greenough family, of which Horatio Greenough, one of our earliest sculptors, whose letters have just been published by Ticknor & Co., is a well-known member. Although several of Mr. Greenough's brothers and sisters displayed an interest in and capacity for art, yet no explanation for this love and devotion can be found in either of the parents, nor in the ancestors so far as known. The father was 'a sensible, practical, honorable man' from Wellfleet, on the Cape. The grandfather had a collegiate education and good talents, and died at the age of thirty-nine. The mother lived to the age of eighty-nine, was passionately fond of nature, and had a facility for writing, and love for reading, but neither knowledge nor appreciation of art. Of the brothers and sisters of Horatio Greenough, of whom there were eleven, John, the oldest, was born in 1801. He showed when young a love of design, and supported himself for some years in London by painting. Alfred, the fourth son, was interested in art, but never studied it. He afterward entered into business. Richard Saltonstall, the youngest of the sons, born in 1819, distinguished himself at an early age by a portrait bust of Prescott the historian, a fine bronze group of a shepherd-boy and eagle, and the statue of Franklin in School Street, Boston. He has lived in Rome for many years, where his later works are well known. One of the daughters also possessed all the natural gifts requisite for an artist.

THE INCREASING NUMBER of series of monographs on special topics must have attracted the attention of all those who possess any acquaintance with current literature. We have an American science series, a set of science primers, several sets of literature primers, historical monographs, economic papers, and so on. The development in this direction is a perfectly natural one, and one which results from the increasing specialization in study. It is impossible any longer for even the well-informed man to follow methods and details:

he must rest content with results, and even those concisely stated. This multiplication of small books on great subjects has been deprecated, we know, but, as it seems to us, on untenable grounds. When Huxley writes on science in general, Walker on political economy, Geikie on geology, Martin on biology, and Young on the sun, we may rest assured that the results will be beyond criticism.

Within a few days, two additions to these series, both of them extremely important, have been announced. The first comes from the faculty of political science of Columbia college, — a body which has already placed the community under obligations to it not only for its admirably organized and conducted course of study, but for its invaluable *Political science quarterly*. Each of the professors in this school has undertaken the preparation of a work on his own subject; and the series will cover the whole field of political science proper, as well as the allied subjects of public law and economics. Nine volumes are in course of preparation, and in each the historical and comparative method will be followed. The nine volumes mentioned are 'Comparative constitutional law and politics,' by Professor Burgess; 'History of political theories,' by Professor Alexander; 'Historical political economy,' by Prof. Richmond M. Smith; 'Comparative constitutional law of the American commonwealths,' by Mr. F. W. Whitridge; 'Historical and comparative science of finance,' by Dr. E. R. A. Seligman; 'Comparative administrative law,' by Mr. F. J. Goodnow; 'International law,' by Professor Dwight; 'Comparative jurisprudence,' by Prof. Munroe Smith; and 'Literature of political science,' by George H. Baker. The first of these volumes will be issued in the autumn.

The second announcement to which we refer will probably attract even more wide-spread attention than the first. It is to the effect, that, recognizing the lack of the accurate and scientific treatment, in an accessible form, of educational and pedagogic questions, the Industrial education association of this city will commence in the au-

tumn the publication of a series of educational monographs under the editorship of the president of the association, Dr. Butler. The papers will treat of various educational topics, historically and critically; and the most prominent educators, both in this country and in Europe, have promised contributions. It is expected that the first monograph will be from the pen of President Gilman of the Johns Hopkins university. The arguments in favor of industrial education and statements as to its proper organization and development will occupy a prominent place in the series, but not at all to the exclusion of other topics. We have heard both of these announcements with much pleasure, and particularly the latter, for it means that the teachers of the country will be able to obtain the opinions of responsible educators on current questions readily and at small cost. It is understood that this educational series will closely resemble in form and style the 'Historical studies' issued from the Johns Hopkins university, under Dr. H. B. Adams's editorship.

AN UNEXPECTEDLY rapid growth in the numbers of students registering in the Cornell university for the Sibley college courses, in the past two years, and since their establishment on their present basis, has already crowded that institution to its utmost capacity in many directions, the number in the college having already approached, within twenty-five, that considered the maximum which can be accommodated in the existing buildings. A new building now in progress, under contracts made by the Hon. Hiram Sibley, and which will be presented to the university, will, however, increase the total space available next year by fifty per cent, and will bring the total number, as a maximum, when all classes are filled on the new basis, up to three hundred.

DISTILLERY-MILK REPORT.¹ — III.

In response to our circular, a number of letters of interest have been received, which we reproduce below:—

[Prof. H. P. ARMSBY, agricultural experiment-station, Madison, Wis.]

I do not think that there is any good evidence of any direct injurious effect of the swill upon the milk if used in a reasonably fresh state, and as a supplementary food; that is, as part of a properly compounded ration. Used too exclusively and in

too large quantities, it is liable to produce disease in the cows, and thus to injure the milk. The great danger connected with the use of distillery swill, however, arises from the fact that it furnishes a most favorable medium for the growth of all sorts of micro-organisms. Unless the greatest care and cleanliness are observed about the stable, portions of the swill are almost certain to accumulate in out-of-the-way places, and serve as breeding-places of these organisms, whose spores contaminate the air of the stable, and almost necessarily infect the milk. While, therefore, I believe that milk of good quality, both as to composition and healthfulness, may be produced when distillery swill is fed, I question whether such will be its quality in the majority of cases: at least, there is always danger that it will not; and as regards that portion of the milk-supply of cities drawn from the small dairies in the outskirts and in the neighborhood of distilleries, which are often in the hands of ignorant and unscrupulous men, the danger is a very grave one. Two valuable papers in the *Milch Zeitung* for 1886 (Nos. 45 and 46) discuss the healthfulness of distillery swill quite fully: the first of them, by Professor Kirchner of Halle, takes substantially the ground that I have indicated above; the second, by a practical farmer, is more favorable to its use. These are all the references I have now at hand.

[E. L. STURTEVANT, M.D., New York agricultural experiment-station, Geneva, N.Y.]

In response to your circular request of May 12, 1887, I would say that we have had no experience at the New York agricultural experiment-station with the feeding of distillery waste or distillery swill. In 1884, however, we had a very carefully planned and executed experiment upon the feeding of brewers' grains in an acid and putrefactive condition. The conclusions derived, while against injudicious feeding, were in no sense detrimental as regards the taste, flavor, appearance, keeping-quality, or composition of the milk, nor as between the hay-fed or the brewers'-grains-fed milk, nor as between the milk from the experimental cows and that yielded by the remaining cows of the herd, all of which is fully reported in our 'Third annual report,' pp. 49-59.

A further general experience with experimental feeding leads me to the belief that oftentimes the sanitary condition of the cattle under objectionable feeding has more to do with unhealthfulness in the milk-product than the actual food used. In support of this latter view, I would say that in 1869 I visited the dairy herds in the vicinity of Glasgow, Scotland. I found the prevalent custom among the farmers was to haul distillery swill daily to their farms, and to feed it to the milch-

¹ Continued from p. 581.

cows which furnished the milk-supply to the city. In the excellent sanitary condition of the cattle to whom this distillery slop was fed, we had a remarkable contrast to the asserted method of feeding in the stables attached to distilleries. At that time the milk-supply of Scotland was supposed to be of very superior quality as compared with that of ordinary city supplies; and I certainly could find no fault with the milk drank at the hotel tables, with that observed in the hands of the distributor, or with the milk observed in the byre at milking-time.

I may perhaps be allowed to assume to myself sufficient experience to be justified in offering the opinion that it is probable that a discussion of the sanitary surroundings of a herd is of more importance than that of the character of the food used, including in the term 'sanitary conditions' the effect upon the health of injudicious feeding. In support of this view, I would refer to experiments reported in the 'Fourth annual report of the New York agricultural experiment-station, for 1885,' pp. 16-34, wherein the adding of vinegar to food in condimental quantities was followed by increased appetite in the animals, and produced no observable detrimental effect upon the products. This conclusion is corroborated by various experiments with ensilage (always in an acid condition), wherein it was found that when ensilage was used in condimental quantities there was increase of appetite and no injurious effect upon product. On the other hand, when ensilage was fed exclusively, there was perhaps a detrimental effect to be observed upon nutrition, apparently coming from the inability to eat a sufficient food-supply, and no detrimental effect to be observed in the milk yielded.

My opportunities have not been such as to enable me to form a judgment in regard to the healthfulness of milk, for such data can only be obtained through actual trial and experience; but if testimony has any weight, the using of milk from distillery-fed animals, including in this term not only the food-supply but the unsanitary condition, must be extremely detrimental to health. We hence have offered in your questions two distinct problems: 1. The practical problem concerning the use of distillery waste as used in connection with unsanitary conditions; 2. The scientific problem as to whether this assumed injurious condition of the milk is derived primarily from the food, or from the conditions under which the food is fed, including the problem of injudicious feeding.

[H. C. DUNAVANT, M.D.]

My opinion, based on chemical and physiologi-

cal reasoning, is, that swill-fed cows could not give wholesome food in the way of milk.

[S. W. ABBOTT, M.D., secretary Massachusetts state board of health, Boston, Mass.]

Chemical analyses will not settle the question. There can be no doubt that milk may be produced which is unfit for use, and at the same time may contain an unusually large amount of milk solids. Experiments in Hamburg in regard to the milk-supply from certain model stables or dairies have shown this to be true. My opinion as to the wholesomeness of distillery swill as food for cows is that it is bad. The principal nutritious portion of the grain has already been withdrawn for the purpose of supplying the necessary elements for conversion into alcohol in the product of the distillery, and the cows are thus defrauded of that which is their natural food.

Analyses.

In answer to the question, What analyses can you give of milk obtained from cows fed on distillery swill? the following replies were received:—

[S. RATTON PERCY, M.D., New York academy of medicine, 1858.]

	From one of the fattest cows in a distillery stable.	From mixed milk of 4 cows just after milking.	From same stable; milk taken from caud.	From another stable; milk from caud.	From another stable; milk from 4 cows just after milking.
Solid particles....	142.0	130.0	131.0	132.0	133.0
Water.....	858.0	870.0	869.0	868.0	867.0
Butter.....	44.0	35.0	31.0	30.0	34.0
Sugar.....	18.0	15.0	17.0	18.0	18.0
Caseine, or curd..	66.0	68.0	70.0	70.0	69.0
Saline matters....	14.0	12.0	13.0	14.0	12.0
	1000.0	1000.0	1000.0	1000.0	1000.0

[Professor SIMON, Baltimore, Md.]

Of many samples of milk examined, I will give here the average result of six samples; specific gravity, 1.029:—

Fat.....	3.77
Caseine.....	4.44
Milk-sugar.....	4.56
Ash.....	0.76
Water.....	86.47

100.00

[Professor DOREMUS.]

Solid particles.....	141.4
Water.....	858.6
Butter.....	44.2
Sugar.....	17.9
Caseine.....	70.8
Saline matters.....	8.5
	1000.0

[E. H. BARTLEY, M.D.]

Milk from two cows at the Blissville swill-stables in 1879, obtained by myself and personally analyzed, gave the following results : —

I.		II.	
Water.....	89.21	Water.....	89.14
Fat.....	1.37	Fat.....	1.23
Sugar }.....	8.80	Sugar }.....	8.95
Caseine }		Caseine }	
Ash.....	.62	Ash.....	.68
	100.00		100.00

Not more than five per cent of thin cream by volume in either specimen ; reaction acid ; under microscope, fat-globules scant, small, and aggregated ; some colostrum-like cells and particles of epithelium.

Sanitary ordinances.

From the answers received, it appears that sanitary ordinances exist in Brooklyn, section 45 of Sanitary code, and in New York, sections 29, 45, 186, and 207 of Code, prohibiting the feeding of distillery swill to milch cows, and the sale of milk from animals so fed. In New York state the same practices are prohibited by chapters 202, Laws of 1884, and 183 of Laws of 1885. In New Jersey, chapter 82, Laws of 1882, prohibits substantially the same. There is said to be a prohibitory law to the same effect in Illinois. The sale of milk from cows confined in distillery sheds, and fed on distillery slops, is prohibited in Chicago. In Massachusetts the sale of milk from cows fed on the refuse of distilleries is prohibited (Chapter 57, sections 5 and 9, of the Public statutes of Massachusetts, as amended by chapter 318 of the Acts of 1886).

[To be continued.]

EXPLORATION AND TRAVEL.

Asia.

MESSRS. BONVALOT and Capus, who are making an attempt to reach India, starting from Fergana, by way of the Alai Mountains and the Pamir Plateau, had reached on March 15 (*Bull. soc.*

géogr., No. 10) the pass of Taldyk, a few days' journey north of Kara-Kul, which is situated in the northern part of the Pamir. Their journey is considered extremely difficult, on account of the severity of the climate, the hostility of the natives, and the difficult roads.

Mr. Carey has continued his interesting journeys in Central Asia. The latter part of the winter of 1885-86 he spent in Chelik, near Lob-Nor. About May 1 he went south, in order to explore the northern part of Tibet. For this purpose he had to cross the Altin Tag and Chamen Tag. Having passed these ranges, he reached the foot of a high chain, which is probably the true Kuen Luen. Here his guides failed to find a pass by which it was possible to cross so early in the season, and he had to travel a considerable distance eastward, through barren and difficult country, until at length an opening was found leading to the valley of the Ma Chu, the head source of the Yang-tse-kiang, which was visited by Prejevalsky in 1879. Want of supplies compelled him to turn north, and he spent some time exploring the district of Tsaidam, which is situated between the Altin Tag and Marco Polo range. In the autumn he struck north, and, after crossing the Gobi, reached Urumchi in the Tien Shan, now the capital of Chinese Turkestan. Here he was well received by the Chinese governor, and despatched to Yarkand, where he arrived early in the present year, and whence a start was made on March 7 for Ladak. It appears that he went chiefly over Prejevalsky's ground. The high chain south of the Chamen Tag, reached by him, are the Columbus and Marco Polo mountains of Prejevalsky. His journeys in Tsaidam are new, while on his way north he followed Prejevalsky's route. The results of this journey, nevertheless, will be of great importance.

Africa.

The *Scottish geographical magazine* for June contains an interesting account of an exploring trip to Mvutan Nsige by Emin Pasha. His remarks on the formation of the lake are of great interest. He describes the mountain-ranges bordering it, and the alluvial deposits on its western coast. Land is forming rapidly on the west side of the lake, it appears, while the mountains on the east side rise steeply from the water. The lake is described as very stormy, the winds blowing with great force up and down the valley. Emin has made two other excursions on the lake since this paper was written ; and the following extracts from a letter, which are published as an appendix to the paper, give the chief results of his work. He writes, "The chief result of my work is the

discovery of a new river, which flows from the Usongora Mountains. It is of considerable size, and flows into the lake at the south. The river, which is called 'Kakibbi' by the Wasongora, and 'Duéru' by the Wamboga, has, near its junction with the lake, a large island. It is, however, on account of the many cataracts, very difficult to navigate; but, on the other hand, it pours into the lake throughout the whole year a large volume of water. Upon its banks, at a short distance from the lake, is the town of Hamgurko, where a considerable quantity of salt of a superior quality is found. The Kakibbi, or Duéru, forms the boundary between the Muénga district of Unyoro, which lies to the east, and the country of Mboga, which lies to the west. The country of Mboga is inhabited by a people who speak a language that appears to be only a dialect of the Kinyoro. To the west-north-west and north, Mboga is bounded by Lendu, a country which lies behind the mountains bordering on the Albert Lake. To the west I found a country inhabited by tribes I take to be Iddio (A-Sandeh). To the south-west I was told there was a large river, on the banks of which there is a colony of Akkas, called 'Balía' by the Wanyoro people. They, however, call themselves, in their own language, 'Betua.'

This information on the country Stanley has to traverse on his way to the Mvutan Nsige is of great interest. Usongora will be found as the name of the island in the Muta Nsige on our map of Central Africa. The great river to the south-west referred to by Emin must be one of the Kongo tributaries. His remarks show that the Sande (Niam-Niam) tribes extend far south-east. The name 'Betua,' by which the dwarfish Akka call themselves, reminds us forcibly of the name 'Watwa,' or 'Batua,' by which, according to Wolf, all the dwarfish tribes of the southern Kongo call themselves. The country of Lendu is difficult to reach from the Mvutan Nsige, the hills on the west side of the lake being very steep.

Stanley's expedition arrived at Leopoldville on April 20 (*Mouv. géogr.*, June 5). It took twenty-seven days to accomplish the distance between Matadi and Stanley Pool, which is five days more than Stanley had estimated. The scarcity of food in this country was the principal cause of the delay. The expedition camped nine days at Leopoldville. Here Stanley obtained for his enterprise the steamers Peace of the Baptist mission, the Henry Reed of the Livingstone mission, the Florida of the Sandford expedition, and the Stanley of the Kongo association. On April 29 every thing was ready, and the expedition embarked. It is believed that Stanley Falls was reached about June 5.

HEALTH MATTERS.

Baldness.

DR. G. T. JACKSON read a paper recently before the New York county medical society on baldness and its treatment. He described four varieties of baldness, or alopecia: 1°. Alopecia adnata, the congenital form; 2°. A. senilis; 3°. A. prematura; 4°. A. areata. A. senilis is that form which occurs in old age, or after the age of forty-five, and is often preceded or accompanied by grayness of the hair. Its cause is a gradual hardening of the subcutaneous tissues of the scalp and a diminution of blood-supply, followed by an obliteration of the hair-follicles. It is but one expression of that general lowering of nutrition incident to advancing years. When the scalp is atrophied, nothing can be done in the way of treatment, but prophylaxis may do a great deal in postponing those changes. A. prematura is that form of baldness which occurs before the forty-fifth year. Of this there are two varieties,—the idiopathic and the symptomatic. The former occurs most commonly between the ages of twenty-five and thirty-five, and is not due to any antecedent or concomitant disease. It differs from the senile form in occurring at an earlier age, and in being unaccompanied by other signs of diminished physical vigor, such as loss of teeth, dulness of sight and hearing. The chief cause of this variety is heredity. Every one has known of families in which the fathers and sons have become bald at a very early age. Another cause is improper or deficient care of the scalp. It is a common practice for men to souse the head daily in water. Ellinger has noted this habit in eighty-five per cent of his cases of baldness. Thinkers and brain-workers are very often bald. Eaton found, in the audiences attendant upon churches and operas in Boston, that from forty to fifty per cent of the men were bald; while in cheap museums and at prize-fights the percentage was only twelve to twenty-five. Stiff hats may cause baldness by compressing the arteries that supply the scalp. Tight and unventilated hats make the scalp warm, and cause it to perspire, thus favoring baldness. King says that baldness of the vertex is due to compression by stiff hats of the arteries which supply that part. The little tuft of hair often observed on the top of the forehead is nourished by arteries which escape pressure. That women do not become bald so often as men is probably because they preserve the cushion of fat under the scalp longer than men do. They do not wear their hats as much as men; nor are these so close-fitting, or made of such impermeable material. They also

give more attention to the hair, and do not wet the head so often. Of all these reasons, Dr. Jackson regards the preservation of the fat and connective tissue of the scalp, and the greater care of the scalp, as the most important. The treatment of this variety of baldness is mainly one of prophylaxis and hygiene. In families where it is hereditary, this should begin at birth, and continue through life. The scalp should be kept clean by an occasional shampoo of soap and

should be avoided. Mr. Goninlock, writing on baldness in the *Popular science monthly*, gives it as his opinion that it is due principally to the high hat and the hard felt hat, and to any other covering that constricts the blood-vessels which nourish the hair-bulbs. Few, he says, will escape the evil effects of twenty or thirty years of rigid tight-fitting hats, the destructive process being delayed only by the length and frequency of respites from this tourniquet of fashion.

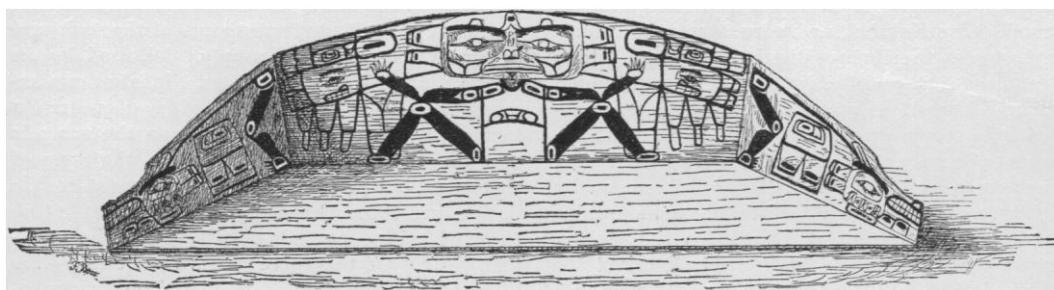


FIG 1. — INDIAN CHAIR, SHOWING THE SISIUTL AND THE RAVEN, THE CREST OF THE OWNER.
(Length 7 feet.)

water, borax and water, or some such simple means. This should not be repeated oftener than once in two or three weeks; and after the washing, the scalp should be carefully dried, and vaseline or sweet-almond oil applied. Women should dry the hair by the fire or in the sun, and not dress it until dry. The hair should be thoroughly brushed and combed daily, for five or ten minutes, with vigor sufficient to make the scalp glow. For this a brush should have long and

ETHNOLOGICAL NOTES.

The serpent among the north-west American Indians.

THE latest issue of the *American antiquarian* contains a long article on the serpent symbol, by the editor, the Rev. Stephen D. Peet. He traces the occurrence of the serpent symbol or serpent myths among many tribes of America. We shall add here several notes on a peculiar form of serpent which plays an important part in the tradi-



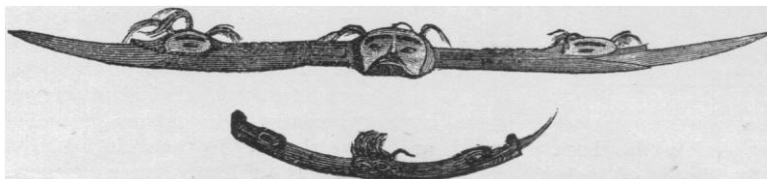
FIG 2. — DANCING-IMPLEMENT, REPRESENTING THE SISIUTL.

moderately stiff bristles, set in groups widely separated from each other. Such a brush will reach the scalp, and brush out the dust. A comb with large, smooth teeth should be used with the brush, to open up the hair to the air. Pomades should not be used, and the daily sousing of the hair discontinued. Women should not use bandoline, nor pull or twist the hair, nor scorch it with curling-irons, nor smother it under false hair. Easy-fitting, light, and ventilated hats should be worn, and working under hot artificial light

tions of the north-west American natives. A characteristic representation is fig. 2, a double-headed snake with a human face in the centre. It is known to the Selish tribes of the Gulf of Georgia, and to the numerous tribes of Kwakiutl lineage. According to Swan, a similar monstrous being, the Hahéktoak, is known to the Makah of Cape Flattery. It has the faculty of assuming any shape it desires, and appears most frequently in the form of a beautiful fish with sparkling scales. It moves with both heads turning for-

ward, the human face in the centre looking backward. It is the crest of one of the gentes of the Kwakiutl, who paint it on their house-fronts. The beam which supports the heavy rafters of their houses is carved so as to represent the 'Sisiutl,' as it is called by the Kwakiutl; and the drums,

ESKIMO HARPOON. — The ethnological collection of Mr. A. Sturgis, on exhibition in the American museum of natural history in New York, contains a fine specimen of an Eskimo harpoon-head from Greenland, which we figure here by the kind permission of Mr. Sturgis. There are very few speci-



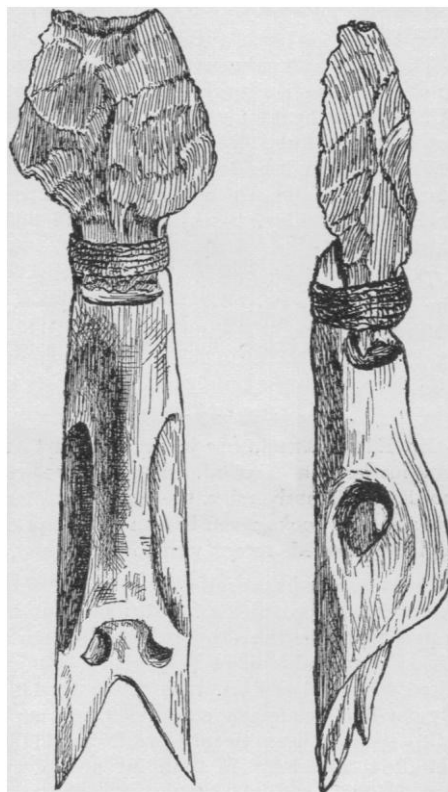
FIGS. 3 and 4. — KNIFE AND DANCING-IMPLEMENT, REPRESENTING THE SISIUTL.
(From Jacobsen's 'Nordwestküste Amerikas'.)

chairs, and dancing-implements of the gens have it for their ornament. A beam of this kind is in the museum at Ottawa, Ont. We have seen a mask of this style in the museum of Berlin. Two knives of the same description, which are used in certain dances, are shown in figs. 3 and 4. Fig. 2 is used in the dances of several tribes, the dancer having a blanket tied round his loins, the upper part of his body being naked. He wears a head-ring and neck-ring of hemlock branches, and has the carved image of the Sisiutl tied to his stomach. Fig. 1 is a remarkable chair, representing the Sisiutl. It will be seen from our figure that here the central figure is winged, and that two additional legs appear on both sides. This is because the owner's father belongs to the raven gens, while his mother belonged to the Sisiutl gens. Therefore both crests are embodied in the design, which is very characteristic. It is engraved from a sketch made on the spot.

The traditions referring to the Sisiutl are very numerous. One of the most remarkable is that Qaniqilaq, the son of God, descended from heaven and met the Sisiutl. He killed it, skinned it, and took out its eyes. The latter he used as stones for his sling, the former as a belt, and both served him to accomplish many exploits.

Other tribes of the same region tell of the same being, but they believe that it lives somewhere at the bottom of the sea. They tell of a man who killed it, and thus acquired supernatural qualities. Among the Qauitchin this tradition is of great importance. They say that the first man of their race encountered the serpent and killed it. Whoever obtains a bone of the serpent becomes a formidable sorcerer, as the sight of it kills whomsoever sees it. The same is told of the Hahéktoak of the Makah, but the latter has a different shape, being single-headed.

mens of this kind in the ethnological collections of America and Europe, the flint head being nowadays replaced by iron. The present implement



ESKIMO HARPOON-HEAD. (From A. Sturgis's collection.)

is of special interest, as it shows the same form as those from the west coast of Davis Strait, and the way in which the Eskimo used to fasten the stone

head to the ivory part. It belongs to the large sealing and walrus harpoon. A similar specimen is in the collections of the British museum. Both these specimens show two perforations at the lower end of the harpoon-head which are not found in the modern ones. Probably these served for holding the harpoon-head to the shaft by means of a thin line, in order to prevent the head from coming off before the seal or walrus was struck.

NOTES AND NEWS.

A GEOLOGICAL society has been founded at Brussels. The foundation of such a society was planned in 1872, after the meeting of the archeological and prehistorical congress; the efforts, however, were unsuccessful, though this became the impulse for the foundation of the geological society at Liege. Mr. A. Houzeau de Letaie took up the old plan, and on April 17, 1887, the foundation of the society, under the name 'Société Belge de géologie de paléontologie et d'hydrologie,' was announced.

— The fourth annual convention of the Association of official agricultural chemists will meet at the U. S. department of agriculture in Washington on Tuesday, Aug. 16, at ten o'clock. Tuesday and Wednesday will be devoted to a discussion of the method of analysis of commercial fertilizers; Thursday and Friday, to cattle-food and dairy-products.

— The advance of education in India is marked by the post-office statistics for the ten years ending March 31, 1886. The number of letters increased from 119,000,000 to 238,000,000 per annum, and the increase in the number of newspapers sent was no less than 115 per cent.

— Mr. Edwin Arnold has just presented to the Indian institute at Oxford, through the vice-chancellor of the university, the Buddhist manuscripts and Pali books given to him by the priests of Ceylon during his recent visit to that island.

— Bates college has received an offer of thirty thousand dollars provided an additional hundred thousand dollars be raised by subscription among the friends and alumni of the college. Of this hundred thousand dollars, it is understood that nearly one-half is already subscribed. It is proposed to spend at least twenty-five thousand dollars of the total amount in founding an observatory.

— Harvard university announces a considerable expansion of its courses in English for next year. Professor Child will offer courses in the English Bible and in Spenser. Professor Briggs will lec-

ture on English literature from Shakspeare to Dryden, excluding Milton. Professor Hill will add to his usual course on the prose writers of the seventeenth and eighteenth centuries a course on the prose writers of the nineteenth century. Mr. Wendell will take a class through the study of the English drama, excluding Shakspeare.

— The Students' aid society of Boston has aided over four hundred worthy students since its organization. Most of the beneficiaries have become teachers. President Freeman of Wellesley recently told what had become of the twenty-five girls aided by the society who graduated from Wellesley in 1886. Three of them are teaching in foreign countries, two among the colored population in the south, and two among the Mormons. Six are at the head of girls' schools in various portions of the country.

— The American public health association will hold its fifteenth annual meeting at Memphis, Tenn., on Nov. 8 to 11, 1887. The topics which have been selected for discussion are, 1°, the pollution of water-supplies; 2°, the disposal of refuse matter of cities; 3°, the disposal of refuse matter of villages, summer resorts, and isolated tenements; 4°, animal diseases dangerous to man.

— Bacteriologists are studying with great thoroughness and persistence the characteristics of the typhoid bacillus. M. Chautemesse, in the course of his researches, has found that this microbe forms spores at a temperature between 19° and 48° C. It develops even in sterilized water. At a temperature of 45° C. the cultivations live for several days, but are destroyed by boiling. The bacilli are destroyed by a solution of bichloride of mercury of the strength of 1 to 20,000, and by a solution of sulphate of quinine, 1 to 800. Carbolic acid, 1 to 400, has no effect upon them, and they are not affected by hydrochloric acid. This latter observation would seem to indicate that the germ would retain its vitality in the gastric juice.

— We learn from the London *Electrical review* (April 22) that Prof. E. Frankland, the well-known professor of chemistry, has recently patented some improvements which he has devised in storage-batteries, the object aimed at being the avoidance of both buckling and the gradual detachment of the active composition from the metallic portion of the plates, both these effects being brought about by the expansion of the active material during the use of the battery. This is effected, firstly, by so enclosing or embedding the active composition in the metallic portion of the plate as to prevent its falling out; and, secondly, by giving sufficient strength to the plate to enable it to resist bending or buckling. Professor Frankland em-

ploys as the active material the hardening mixture of oxide of lead and sulphuric acid, for which letters patent were granted to him in the year 1882 (No. 4,303); and whilst this mixture is in a pasty condition he moulds it into small cylinders or rods of convenient length and thickness, either by rolling, pressure through a draw-plate or tube, or other convenient means, and then flattens them on two opposite sides by pressure between two flat boards or otherwise. After these flattened cylinders have become sufficiently hard, they are placed in rows in a casting mould of dimensions corresponding to the size of the battery-plate required, and at such distances apart and from the edges of the mould as to give sufficient space for the quantity of metal necessary to impart adequate strength and rigidity to the plate. Suitable molten metal, such as lead or an alloy of lead and antimony, is then poured into the mould until the interstices between the flattened cylinders are completely filled. In this way a plate is obtained, in which the active material is incased except on the flattened sides of the cylinders overlaid with metal, so that it cannot subsequently fall out during the charging and discharging of the battery, or even when subjected to considerable rough usage.

— At a recent meeting of the Physical society, London, Mr. C. V. Boys described some methods of producing very fine glass fibres. The author finds it best to use very small quantities at high temperatures, and that the velocity of separation should be as great as possible. To obtain a great velocity, Mr. Boys used a cross-bow and straw arrow, to the tail of which a thin rod of the substance to be drawn is cemented. The free end of the rod is held between the fingers, and, when the middle part has been heated to the required temperature, the string of the cross-bow is suddenly released, thus projecting the arrow with great velocity, and drawing out a long fine fibre. By this means fibres of glass less than one ten-thousandth of an inch in diameter can be made. The author has also experimented on many minerals, such as quartz, sapphire, ruby, garnet, felspar, fluor-spar, augite, emerald, etc., with more or less success. Ruby, sapphire, and fluor-spar cannot well be drawn into fibres by this process, but quartz, augite, and felspar give very satisfactory results. Garnet, when treated at low temperatures, yields fibres exhibiting the most beautiful colors. Some very interesting results have been obtained with quartz, from which fibres less than one hundred-thousandth of an inch in diameter have been obtained. It cannot be drawn directly from the crystal, but has to be slowly heated, fused, and cast in a thin rod, which rod is attached to the arrow as previously described. Quartz fibre

exhibits remarkable properties, as it seems to be free from torsional fatigue, so evident in glass and metallic fibres, and on this account is most valuable for instruments requiring torsional control. The tenacity of such fibres is about fifty tons on the square inch.

— The London *Times* publishes a telegram from Vienna to the effect that a Greek scholar, M. Papageorgiu, residing in Philippopolis, has discovered an ancient manuscript containing portions of Aristotle's works. The manuscript is of the fourteenth century, and contains one hundred and eighty pages, which comprises four books of the treatise 'On the heavens,' two books of 'On generation and decay,' the first three books of 'On the soul,' and parts of the 'Sophistical refutations.' The manuscript is in an excellent state of preservation, the vellum being clean and strong, and all the writing perfectly legible. There are marginal annotations of the fifteenth century. M. Papageorgiu, on completing his researches, will publish an account of them in pamphlet form. The chief point brought out thus far by him is that the newly found manuscript differs in some important particulars from Didot's and other existing editions. Moreover, it contains extracts only from the genuine Aristotelian writings, and nothing from the writings which are usually held to be spurious.

— J. Liznar (*Wiener akad. Anzeiger*, 1887) has arranged and computed the observations on terrestrial magnetism of the international polar stations of Fort Rae and Jan Mayen, in order to inquire into the existence of a period of twenty-six days of the magnetical phenomena. As the periodical oscillations of the magnetical elements are the greater the closer we approach the magnetical pole, the observations of Fort Rae, Cumberland Sound, and Jan Mayen were the most favorable for these researches. As those of Cumberland Sound were not published until the close of last year, Liznar confined himself to arranging the available material from Fort Rae and Jan Mayen. The result of his inquiries is, that the amplitude of the period of the oscillations of declination is 55.1' at Fort Rae, 34.8' at Jan Mayen, while it is only 0.4' at Vienna, and 1.4' at Pawlowsk. The length of the period is 25.85 days, while former computations gave a value of 25.97 days. These results show that the rotation of the sun, which is the probable cause of these periods, has a far greater influence on the magnetical elements, as might have been anticipated from observations in lower latitudes.

— In *Scribner's magazine* for July, Prof. D. A. Sargent, M.D., of Harvard college, who is an au-

thority on the general subject of athletics, will publish his first extended article in that field, under the title 'The physical proportions of the typical man.' In it Professor Sargent will give a standard of physical measurement, based on the measurements of ten thousand individuals. This furnishes a basis of comparison by which any person can gauge his proportions with those of the typical man. The article will contain charts for this purpose, founded on these observations.

— Messrs. G. P. Putnam's Sons, New York, have published a seventh edition of 'Voice, song, and speech,' by Lenox Browne and Emil Behnke. Six editions of this work have been exhausted since its publication three years ago. The last two editions have been published in cheaper form, in compliance with what was believed to be a public demand. In order to attain this end, the most expensive item of the earlier editions has been omitted; namely, the photographs of the larynx and soft palate during the tone-production, engravings being substituted. In all other respects the book remains unaltered.

— The final excursion (to the region of the Upper Delaware, the Shawangunk Mountains, and the Catskills) arranged in connection with the spring course of lectures on geology, of the Philadelphia academy of sciences, will extend over a period of two weeks, beginning with the first week in July. The field-study will comprise an examination of the Devonian rocks, with their contained fossils, and the general phenomena of glaciation, erosion, and mountain and valley formation.

— Several papers on 'French traits,' by W. C. Brownell, the first of which, on 'The social instinct,' will appear in *Scribner's magazine* for July, are the fruit of discriminating observation by one who has a keen appreciation of, and sympathy with, the French mind. In these essays it is said that Mr. Brownell will make many striking comparisons between English and American, and French social life and customs.

— The well-known catalogue of scientific books issued by D. Van Nostrand, New York, has been entirely revised to date. All the new and more important works in the different branches of science have been added, and considerable reductions in prices have been made.

— The latest biography in the American statesmen series is 'Henry Clay,' by Carl Schurz (Boston, Houghton, Mifflin & Co.). Mr. Schurz takes two volumes to tell the story of the great leader's life, and he does it with marked vivacity of style, and accuracy of detail. The design of the entire

series is being as faithfully carried out as it was well conceived.

— Professor Arthur T. Hadley of Yale has been made lecturer on railroad administration at Harvard. This is a well-deserved compliment to Professor Hadley's abilities.

— The list of royal authors is to be increased by the addition of the name of King Leopold of the Belgians, who is preparing a somewhat elaborate history of the conquest of England by the Normans. The king recently visited the battle-field of Hastings in order to locate the spot where Harold fell.

— The general council of the University of Glasgow has decided that the establishment of a chair of education in the university is necessary.

— Eaton now has 964 names on its roll, the largest number on record. At Harrow 541 are registered.

— At the University of London recently, twenty-five ladies were presented for the A.B. degree, ten of them with honor, and two for the B.Sc. degree.

— Professor Prestwich has resigned the chair of geology at Oxford, feeling himself unable to carry on the great amount of work required.

— The Russian government is about to have a series of pipe-lines laid down for the conveyance of petroleum over the Suram Pass, a distance of thirty-five miles. At present the oil is transported over the pass in short trains of six tank-cars each, with two engines to each train. Upon the completion of the pipe-lines, the oil will be pumped from reservoirs at Michalova, on the Tiflis side of the Pass, directly into similar reservoirs at Kirrill, on the Batum side.

— A company in London, England, furnishes water, at a pressure of 700 pounds to the square inch, to customers, for running elevators, printing-presses, pumps, etc., through the medium of water-motors. The company has twenty miles of main laid, and furnishes water for 458 motors.

— The sixtieth annual meeting of the German natural scientists and physicians will be held at Wiesbaden from Sept. 18 to Sept. 24 next. In connection with the meeting, an exhibition has been arranged for, to include new and complete sets of apparatus, instruments, and so forth.

— With its issue for May 5 last, the *Central-Organ für die Interessen des Realschulwesens* published a most valuable list of all the works on Scandinavia and its literature that appeared during the year 1886.

— The King of Italy has signed a decree authorizing the publication of a new and complete edition of Galileo's works, at the expense of the state. The ministry of education has, with the co-operation of leading scientists, undertaken the preparation of this edition. It will comprise twenty quarto volumes, of about five hundred pages each.

— Work on the tunnel under the Hudson, between Jersey City and New York, has recommenced, and an average progress of three feet per day is being made. Incandescent electric lights are being substituted for the arc lights previously employed.

— There are at present upwards of one hundred miles of cable-railway in operation in this country, and about fifty miles in course of construction.

— The Clarendon press, Oxford, propose to publish from time to time, under the title 'Annals of botany,' original papers, adequately illustrated, on subjects pertaining to all branches of botanical science; also articles on the history of botany, reviews and criticisms of botanical works, reports of progress in the different departments of the science, short notes and letters. A record of botanical works published in the English language will be a special feature.

— The French are preparing a series of monographs identical in scope and character with the very successful 'English men of letters' series. The title will be 'Les grands écrivains français,' and the following volumes are already announced: 'Victor Cousin,' by M. Jules Simon; 'Madame de Sévigné,' by M. Gaston Boissier; 'George Sand,' by M. Caro; 'Turgot,' by M. Léon Say; 'Montesquieu,' by M. Sorel; 'Voltaire,' by M. Brunetière; 'Villon,' by M. Gaston Paris; 'D'Aubigné,' by M. Guillaume Guizot; 'Racine,' by M. Anatole France; 'Boileau,' by M. Brunetière; 'Pascal,' by M. Havet; 'Rousseau,' by M. Cherbuliez; 'Joseph de Maistre,' by the Vicomte E. Melchior de Vogüé; 'Lamartine,' by M. de Pomairols; 'Balzac,' by M. Paul Bourget; 'Musset,' by M. Jules Lemaitre; 'Sainte-Beuve,' by M. Taine; and 'Guizot,' by M. G. Monod.

— Sir Henry Roscoe, M.P., has introduced a bill into parliament to make provision in day-schools by which young persons who have passed through the public elementary schools, and others, may obtain further instruction in technical subjects. The bill empowers any school board, local authority, or managers of a public elementary school, to provide day technical and commercial schools and classes for the purpose of giving instruction in any

of certain subjects. These include the several science subjects which are specified in the directory of the science and art department, and in which that department undertakes to examine. The following subjects are also included: the use of ordinary tools, commercial arithmetic, commercial geography, book-keeping, French, German, and other foreign languages, and freehand and machine drawing. The addition of other subjects may be sanctioned from time to time by the committee of council on education or by the science and art department. For the purpose of carrying on these schools and classes, the power of school boards, other local authorities, and school managers, is to be in every respect the same as for providing ordinary elementary schools. Moreover, they are to have power to provide, or contribute to the maintenance of, laboratories and workshops in endowed schools for the purpose of carrying on classes or instruction under the bill. However, all these schools and classes are to be subject to the inspection of the officers of the committee of education or of the science and art department; and before a scholar is admitted he must have passed the sixth standard or some equivalent examination. The education committee and the science and art department are authorized to give grants on such conditions as they may lay down for any of the subjects taught in these technical or commercial schools or classes. For the purpose of obtaining grants, a technical school or class must be one carried on under minutes to be made by the science and art department, and laid on the table of the house of commons in the same way as the minutes that regulate the grants of the education department.

— Beginning with September, 1887, the University of Kansas will offer, in addition to the general and special courses already in existence, a four-years' course in electrical engineering.

— The date of inauguration of the mineral exhibition at Lima, Peru, has been changed from Oct. 1, 1887, to June 21, 1888.

LETTERS TO THE EDITOR.

** * The attention of scientific men is called to the advantages of the correspondence columns of SCIENCE for placing promptly on record brief preliminary notices of their investigations. Twenty copies of the number containing his communication will be furnished free to any correspondent on request.*

The editor will be glad to publish any queries consonant with the character of the journal.

Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

Height of a meteor.

My observation of the course of the meteor which appeared at about 8.42 on the evening of June 15

may perhaps be made use of in determining the height of the meteor above the earth's surface.

When I first saw the meteor, it was passing, I should say, through the constellation Leo Minor. I am confident that it passed a little east of Beta Leonis Majoris, say three degrees, and I think that it passed east of Gamma Virginis, near which it disappeared. While passing between these two stars, it emitted two flashes of brighter light,—white or somewhat bluish. Its motion was slow.

J. R. W.

Dorchester, Mass., June 21.

Museums of ethnology and their classification.

The article of Dr. Boas, to which you call attention in your note to myself, treats of two distinct subjects: first, the interpretation of similarities; and, second, the best method of grouping archeological objects in the museum. In Professor Mason's report the same subjects are discussed. The interpretation question has but a very remote connection with the museum question, and as I have already discussed it somewhat at length in the 'Third annual report of the bureau of ethnology,' under the head of 'Activital similarities,' I think I may well neglect that subject in this short communication.

The functions of a museum are twofold: first, as a repository of materials for the investigator; second, as an objective exemplification of some system of knowledge pertaining to the subject for which the collection is made, to be used by an instructor with his pupils, and as an exhibition of facts for the passing observer who visits the museum.

The first purpose is of prime importance: the history of museum administration abundantly develops this fact, and more and more is its value understood. It is in this manner that great museums make substantial contributions to science, and increase the knowledge of the world. The successful management of a museum for this purpose involves the study of museum cases and various other appliances and devices, together with museum records, descriptive catalogues, etc. In the performance of this function the methods and appliances of the national museum are of the highest excellence, but it would require a volume to fully set them forth. Professor Baird, one of the greatest organizing minds of the scientific world, has devoted a large part of his life to this subject.

The secondary use of a museum, mentioned above, somewhat interferes with its primary use; and because it is secondary it must not be allowed to interfere with the more important function. In a great museum like that at the national capital, the collections are so vast that the public exhibition of them all is impossible: only a very small per cent can be shown with reasonable expenditure. This being the case, the secondary use interferes with the primary use only to that limited extent. A few selections are made to be shown to the public: the great mass of material is kept ready to do service for the investigator. Therefore, with regard to the arrangement of the materials for the museum for public exhibition, the question is narrowed down to this: first, on what principles shall the selections be made? and, second, in what order shall they be arranged? That is, the administrator of the museum is called upon to determine what is the most useful lesson to the gen-

eral public which his materials can be made to teach. Every investigator will be more or less likely to consider his own subject of prime importance, as it is to himself; and every instructor is, in like manner, likely to consider that his system of instruction is of prime importance. As research progresses, one set of problems after another comes to the front, and is for the time being of chief importance. For such reasons the museum appliances for exhibition should be of an easily adjustable kind. No sound philosophic scholar, be he investigator or instructor, will assert that his own system is complete and final, that any classification or arrangement is ultimate. It is in view of these facts that the authorities of the national museum have devoted their efforts very largely to methods of exhibition, to the consideration of cases, trays, stands for mounting, etc., so as to have the parts interchangeable and easily readjusted to new conditions,—new facts arising from the advance of the science and from the enrichment of the collections; and it seems to me that many problems involved have been very satisfactorily solved. The actual exhibition portion of the collection in the national museum has not been put into permanent shape. What has been done has been experimental and tentative. The arrangement at one time may be very different from that of another; and this is rendered easy and inexpensive by reason of the system above described.

Now, Dr. Boas offers a system or plan for the arrangement of the materials which relate to the pre-Columbian peoples of America and their descendants. He would have them arranged by tribes. On the discovery of America there were probably many more than twenty-five thousand tribes inhabiting the country, each a little band of people organized into a body-politic, and autonomous, at least for all domestic purposes. But probably within the first year, changes were made in some of these bodies-politic: some coalesced by treaty or conquest, others divided through disagreement, individuals from some tribes took up their abode and became incorporated with other tribes: and so, by various methods from time to time, all of these bodies-politic were in a flux; so that a hundred years after the discovery of America it is not probable that there existed any one tribe which could claim to be the pure and simple descendant, without loss, admixture, or change, of any tribe existing at the time of the discovery. These changes have been going on more and more rapidly until the present time, and they are still going on. Most of the tribes best known to history have been absorbed, consolidated, and redivided again and again. Now, this means simply that under primitive and under modern conditions alike there has been no permanent tribal organization,—a body-politic whose history can be followed as that of one people by hereditary descent. A museum collected to represent the tribes of America, therefore, to be properly representative, would have to be collected as the census of the native inhabitants of India has been taken, all in one day, by an army of collectors. Collected in any other way, it would have no proper significance; and collected in the manner suggested, it would have very little scientific value.

But if a classification of the tribes of North America were possible, the archeologic collections actually made in the country could not be relegated to them, for the tribes have been forever migrant.

The materials are derived from a variety of sources, which may be briefly enumerated as follows. First, those taken from the mounds. But we now know that many tribes have erected mounds, and oftentimes the same mounds have been occupied by different tribes belonging even to different linguistic stocks. Only a few mounds have been or can be relegated to the Indians who built them. Second, another class of materials has been found in stone graves, ossuaries, and other burial-places; but it is rarely the case that these burial-places can be referred to the specific tribes that used them. Third, much of the material is distributed on the surface of the earth, and picked up in woods, fields, caves, etc.; but it is very rarely indeed that any of this material can be referred to specific tribes. Then there is a vast body of material in the ruins of the arid regions of the west, very little of which can be relegated to specific tribes. Again, collections have been made from time to time, in the years and centuries past, from the Indians themselves; but as these tribes have been ever changing, as heretofore remarked, and as the names of tribes change from time to time, so that the synonymy is exceedingly complex and difficult, the same names being used for different tribes, and the same tribe being known by different names, there is no historical collection of any magnitude in the land that could with confidence be affirmed as coming from definite, specified tribes. Again, very many of the articles which are brought together in a large archeologic museum are the materials of barter from tribe to tribe. This barter has been on a scale so extensive, that, if there were no other difficulties in the way of determining the inventors and makers, this would be sufficient to cast a doubt upon nearly all collections made. There is yet another source that contaminates much of the material collected, and puzzles the student of archeology to the highest degree. Stone implements, shell ornaments, copper implements, utensils, etc., were, in the early history of the country, manufactured on a large scale by traders, to be bartered with the Indians for peltries. A vast amount of this material was thus manufactured; and, because it was more or less superior to the work of the Indians themselves, it intrudes its way before all other objects into the collections of the country.

It will be seen, that, taking all things together, a tribal arrangement of the archeologic museum of North America is an impossibility by reason of its nature.

But the tribal museum as suggested by Dr. Boas would, in practical affairs, be an impossibility by reason of its magnitude. In the many thousand groups of which it would be composed, the objective material would be duplicated over and over again, and to the observer would be monotonous and meaningless.

But may not the tribes be classified? The so-called 'ethnic' classifications of mankind have usually been based upon physical characteristics, found in the relative proportions of the parts of the body, which has led to a high development of anthropometry; in the characteristics of the cranium, which has led to a high development of craniology; and in the color of the skin, the texture of the hair, the attitude of the eyes, etc.; but no thorough classification of mankind on these characteristics has ever been established. This only has been done: a greater or less number of varieties have been de-

scribed as types; but, whenever the attempt has been made to relegate the peoples of the world to these varietal types, the task has been found impossible. Mankind cannot be classified into races thoroughly inclusive and exclusive. Very much more has been done in the classification of languages; but this furnishes a very imperfect classification of peoples. In fact, it does not properly mean an ethnic classification. I know of no attempt to classify mankind by arts, or by institutions, or by opinions, worthy of the mention; yet arts may be classified, institutions may be classified, and opinions or philosophies may be classified, but the results thereof are in no proper sense a classification of peoples.

In this connection it is sufficient to say, that, as there is and can be no ethnic classification of the tribes of America, so there can be no classification of their arts on that basis. Yet we might classify their arts in a museum on the basis of classes derived from linguistic affinities; but it would be wholly arbitrary, and lead to no valuable results. The Paiutes of Utah, the Comanches of the plains, and six of the Pueblos of New Mexico, that are called by the bureau of ethnology the 'Shinumos,' and included in the ancient province of Tusayan, all belong to the same linguistic family; but their arts are most diverse, as will readily occur to any one familiar with the subject. The Apaches of Arizona and New Mexico would be thrown into a group with the Timne Indians in the region of Lake Athabasca. And like illustrations might be extended to an indefinite length.

Dr. Boas suggests a geographic distribution in a manner which makes it appear that he considers a geographic classification to be essentially the same as an ethnographic classification, but the two are altogether different things. It is said that prairie-dogs, owls, and rattlesnakes successively occupy certain underground habitations on the plains, but they are not thereby classed as one group in systematic zoölogy; and he who supposes that the multifarious tribes in one region of America are of the same stock, or can in any proper way be classified as one, has failed to understand the ethnology of the American races. But this leads to the consideration of a classification by geographic provinces, as advocated by Bastian and referred to by Boas. If the primary classification of the museum should have this basis, some very interesting facts would be presented. It is well known that zoölogic provinces and botanical provinces have been defined by various biologists, and the facts connected therewith are of great interest. In like manner the art provinces of North America are of great interest. To this subject the bureau of ethnology, under my charge, has given much attention, and gradually we are reaching some interesting results; and at the present stage of this research, if we could have a grand museum arranged on this basis, investigations would be made with greater ease, and perhaps facts and ideas would be suggested which will not be discovered in the lack of such a grand museum. Yet I should hesitate to affirm that that was the best arrangement for the national museum or any other great collection.

The human activities which characterize mankind may be classed as arts, institutions, languages, and opinions or philosophies. Of these activities, the arts only can be represented in a museum, and they but in part. An anthropological museum, therefore,

is an impossibility; but we may have a museum of arts, including the arts industrial and aesthetic. But, while such a museum might be possible, it is impracticable, for a collection of the arts of all peoples of all times would be of such magnitude that it could not properly be made and preserved within practical conditions of economy. That which the great institutions of the world really attempt is an archeological museum,—a museum of the antiquities of the higher races, and of the past and present of the lower races. In the administration of such a museum it may be considered best to segregate a part thereof for exhibition, as indicated in a previous part of this letter; but their arrangement by tribes on ethnic characteristics of any kind is an impossibility. Their arrangement by geographic districts is possible, but the lessons taught thereby are not of prime importance, and the cost of such an exhibition would be excessively expensive,—quite out of proportion to the value of the results. The scientific or technologic classification is all that remains, and this has yet to be developed.

Will the editor of *Science* indulge me in one more remark, as a corollary to what I have said?

There is a science of anthropology, composed of subsidiary sciences, which I group as follows: the biology of man, which is the study of the animal man, and may be considered as belonging to biology proper, or anthropology; there is a science of psychology, which is a part of anthropology; there is a science of technology, which includes all the arts of mankind; there is a science of sociology, which includes all the institutions of mankind; there is a science of philology, which includes the languages of mankind; and there is a science of philosophy, which includes the opinions of mankind; but there is no science of ethnology, for the attempt to classify mankind in groups has failed on every hand. Perhaps the most distinctive group of men yet discovered in the world are the Eskimos. They have in a general way physical characteristics which separate them from other peoples, but these distinctions fade out on the western coast of America and eastern coast of Asia. They have arts peculiar to an arctic habitat, but their arts are not exclusively their own. Their institutions are yet practically unknown. Their opinions, as represented in their mythologies, are imperfectly known, but they yet furnish no characteristics by which they can be segregated from many other peoples; and Mr. Dall has shown that their languages are not wholly unconnected with other languages of the north. But when the attempt is made to set up other races in the world, it wholly fails. The unity of mankind is the greatest induction of anthropology.

J. W. POWELL.

Washington, June 11.

I have to say a few words in reply to Major Powell's criticism of my letter in *Science* of May 20. It will be seen that in regard to several points which are discussed in my letter of June 17, and Major Powell's letter of to-day, there is no difference of opinion between Major Powell and myself, as his remarks would imply.

Major Powell infers that my remarks refer to archeological collections of pre-Columbian peoples. If he will kindly look at the contents of my two letters, he will see that no mention has been made of such collections, but that we discussed the general question of studying and arranging ethnological ma-

terial. The mere fact that we do not know to which tribes archeological specimens belong excludes them from our discussion, and demands a different kind of treatment. I fully agree with Major Powell's remarks on this subject, but venture to say that they do not belong to the question at issue.

A few words more on Major Powell's remarks on the classification of tribes and the alleged impossibility of arranging a tribal museum. The problem has been solved by numerous museums, even much larger than the national museum. The ideal plan of their arrangement is to exhibit a full set of a representative of an ethnical group, and to show slight peculiarities in small special sets. Experience shows that this can be done with collections from all parts of the world without over-burdening the collection with duplicates, and without making artificial classifications—only by grouping the tribes according to ethnic similarities. Such groups are not at all intended to be classifications, as Major Powell infers in his remarks on this subject. The principal difference between the plan advocated by Major Powell and adopted by Professor Mason, and that of other museums, is, that the latter exhibit the individual phenomenon, while the former make classifications that are not founded on the phenomenon, but in the mind of the student.

DR. FRANZ BOAS.

New York, June 18.

Small-pox hospitals.

In your issue of the 20th of May I notice a statement concerning the peculiar effect of small-pox in the vicinity of hospitals for that disease. Some years ago, small-pox was local here, and upon the termination of the case the bedding was burned in the yard of the premises; and I am informed, that, in the direction in which the smoke was driven by the wind, several cases of small-pox developed, while the surrounding neighborhood was otherwise free from it.

Among our acclimated people this disease is more dreaded than yellow-fever. The people here are opposed to burning bedding of yellow-fever patients, but favor burying or sinking in the channel. Our atmosphere never being purified by frost, our reliance must be upon the winds to purify and disinfect. Here every thing rapidly decays, and passes away into the atmosphere.

HORATIO CRAIN.

Key West, June 7.

The scientific swindler again.

About six weeks ago a delightfully intelligent and amiable deaf-and-dumb man appeared in Pottsville, and was entertained hospitably by Mr. Bard Wells, late of the geological survey of Pennsylvania, to whom he gave some valuable books, and from whom he took some, also a compass. He left Pottsville suddenly without paying his hotel-bill.

About two weeks afterward he called at the office of the survey, in Philadelphia, after office-hours, and represented himself to the janitress as an assistant on the survey, sent by the assistant in charge of the office to get certain survey reports. Having no written order to show, he was refused admittance, and went away very angry.

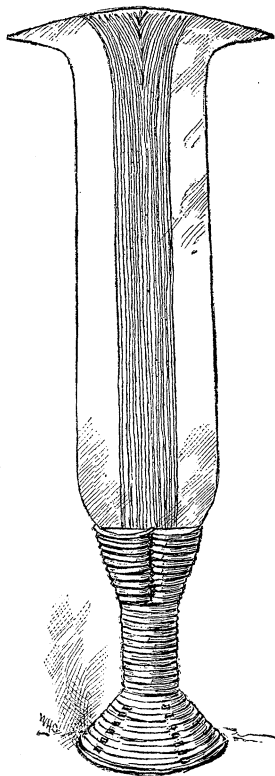
I see that he has turned up at Syracuse. It is astonishing that the fellow can have managed to escape capture so long.

J. P. LESLEY.

A Bayanzi execution.

It may be interesting to ethnologists to give a brief account of the mode of execution among the Bayanzi, a large tribe of negroes inhabiting the country between the Kongo and the river draining Lake Leopold II., which empties into the Kwa, the largest southern affluent of the Kongo. The Bayanzi are said to be peaceful negroes, quite skilful in agriculture, and to excel in wood-carving and working iron into weapons of various kinds.

The executioner's sword is a short, heavy two-edged weapon, blunt at the end, where it projects in



BAYANZI SWORD.

a spur on each side. The hilt is of wood wound with brass wire, giving a very firm grip. The series of shallow grooves through the middle are called 'blood-grooves.'

In executing, the condemned is made to sit down on a block just behind a post, his limbs passing on each side of it. The post reaches to the height of his chin. His arms, legs, and body are tied to stakes. A strong sapling is bent down, having at its extremity a collar suspended by cords. This collar is placed around the victim's neck, producing so great tension, that, when the executioner delivers the blow, the severed head is thrown into the air with the force of a bomb. In all probability, this device for making the neck taut arises from the clumsy nature of the sword employed, and the consequent difficulty in using it for decapitation. The post in front of the man's neck also facilitates the entire removal of

the head. Previous to the execution it is usual for the people—men, women, and children—to torment the prisoner with fire-brands, thorns, and all sorts of devices, while he is in this uncomfortable pillory. This execution shows an ingenious arrangement of machinery to accomplish an end, resulting in a queer combination of hanging and decapitation.

The circumstance which forms the subject of this paper was witnessed in November, 1884, at Loukoléla, by Mr. E. J. Glare. Lieut. E. H. Taunt, U. S. navy, collected the sword. Mr. W. P. Tisdell sent in a scythe-shaped sword said to have been used for the same purpose. So far as known by the writer, this is the first time that an account of the Bayanzi or a similar execution has ever been published.

WALTER HOUGH.

Washington, June 9.

An advance in educational advertising.

The announcements annually made by the better class of educational institutions in this country are generally characterized by a wholesome modesty, both as to style and substance. Indeed, one might infer from their perusal that there existed among the educational fraternity a code of ethics nearly as rigorous as that of the medical profession. That many exceptions to this rule have occurred, and are occurring, has long been known; and ten years ago Prof. F. W. Clarke amused and interested the reading public by the publications of some choice selections from advertising literature issued by a few schools in the west and south, where, as Professor Clarke remarked, the people are 'untrammelled by effete conventionalities.' He also explained the backward state of the art in some other parts of the country by saying that 'New England and the middle states are too much tied down by routine and tradition to produce such rare developments of the intellect.'

It is gratifying to know that in one spot, at least, of this benighted region, it begins to look as if somebody had cut the string. The institution inaugurating a new departure is not found, as in the instances cited by Professor Clarke, in an obscure country town whose location is only revealed after a careful study of the map, but it is in and a part of the very 'Hub' itself. With the keen insight and business tact which is supposed to be inseparable from the genuine down-east Yankee, the author of the new idea has evidently studied the question of advertising with a determination to adopt that style which experience has shown to be the most successful. As might have been anticipated, the result of his investigations is apparently, that, in the present state of our knowledge of the art, its highest development is embodied in the methods of the vender of patent medicines.

Your New-Englander is nothing, however, if not cautious, and it must not be assumed that the full power of the new method has been brought into play at once. The first output was observed in the advertising columns of a well-known newspaper, a copy of which recently fell into the hands of the writer. The announcement of a widely known educational institution, everywhere recognized as one of the first, if not the very first, of its type, began with a display in large capitals of the words, '*Beware of imitators!*'

Had this phrase occurred in connection with the advertisement of some western school, 'untram-

melled by effete conventionalities,' it might have been clipped out and consigned to the collection so unselfishly organized and begun by Professor Clarke, but a second thought would hardly have been given to it. Emanating as it did, however, from the very heart of the Back Bay region, it is worthy of the serious and earnest consideration of all who are interested in educational progress.

What does it really mean? But two explanations seem plausible. The first, which is mentioned only to be rejected, is that the authorities of the institution under consideration are privately and unofficially of the opinion that it is a mistake; that its courses of study are ill-adjusted, its facilities and equipment meagre and inadequate; and, in short, that its patrons are being 'taken in.' Public or private admission of this belief would be fatal, but the demands of Puritan conscience cannot be wholly ignored; and the outcome is the ingeniously worded notice, which, while inviting confidence in the school itself, generously warns the public against any and all others who may be trying to do the same thing in the same way. Such an intricate and delicate system of ethics might possibly originate in the vicinage of the Concord school, but to ordinary people it is incomprehensible, and the hypothesis is rejected as being untenable.

There remains only the explanation which has already been suggested: it is the beginning of new things in college advertising, or, rather, it is the application of the old and well-established, none-genuine-unless-the-name-is-blown-in-the-bottle method in a new direction. That the advantages of the new departure will be universally recognized cannot be questioned. Indeed, it can be shown that a little timid experimentation along the new line had already been undertaken by institutions more or less 'untrammelled;' but, now that cultured Boston has stamped the guinea, it can no longer be looked upon with suspicion.

Our friends of the west and south may now begin to woo the public in this new but entirely orthodox manner, and ample opportunity will be afforded for the display of hitherto unsuspected genius. Even the most venerable and conservative schools must expect to be drawn in, or they will be distanced in the race. The infinite variety of which the new method is capable is shown on every page of the daily paper; but it is more than likely that some special line will be worked, and among various styles something like the following is likely to be popular:—

A CURIOUS CIRCUMSTANCE!

There has been much comment and discussion on the street to-day, in reference to the fortunate escape of Mr. Beverly Witherspoon from drowning, when the tug-boat Martha went down yesterday. Just as the unfortunate boat was entering the harbor, she was struck amidships by a huge wave, which capsized her, and all on board were lost. Had Mr. Witherspoon been on board of the Martha, he would have gone down with the rest. When questioned by a reporter to-day, he declared that he could only attribute his good fortune to the fact that he was educated at the _____, an institution of learning which is widely, etc.

Or this:—

ADMIRAL _____,

President of the _____.

Dear Sir,—Although generally unwilling to appear as in any way favoring institutions of learning, I cannot refuse to allow you to publish the true history of my son's case, if the interests of humanity will be furthered thereby. For several years my son was afflicted with ignorance and stupidity. As he grew older the affliction increased, and at last I felt compelled to send him to school in the hope of effecting a cure. During several years, and at vast expense, I kept this up, sending him to the famous H—d university, the college of N— J— at P—, Y— college, and other well-known schools; but he grew worse all of the time, and appeared to be rapidly approaching imbecility. One day, just as I was about to give up in despair, a friend accidentally mentioned your institution, and spoke of the great benefit it had been to a young man of his acquaintance who was similarly afflicted. Like the proverbial drowning man, I was ready to catch at a straw, so I at once put my son under your care. At the end of three months a great improvement was observed; after a year, intervals of lucidity became more frequent; and at the end of his course, when he had received your diploma, he was able to procure an excellent position as a writer of articles on political economy. I have no objection to your mentioning my name in your future advertisements.

Yours respectfully,

But, unless the thing is copyrighted, its originators will be obliged to keep a sharp lookout, as a great deal of this sort of talent is lying around loose. X.

Queries.

6. VOLAPÜK.—Where can I obtain any specific information concerning Volapük, the universal language about which a note appeared recently in *Science*?—H. T. P.

[Volapük was invented by Father Johann Martin Schleyer of Constance, Baden, Germany, and an inquiry addressed to him would undoubtedly elicit information as to literature, etc. M. M. Hachette et Cie, the well-known Paris publishers, have recently issued a book on this subject.—Ep.]

CROSBY'S VITALIZED PHOSPHITES

Composed of the Nerve-giving Principles of the Ox Brain and the Embryo of the Wheat and Oat.

Is a standard remedy with physicians who treat nervous or mental disorders. The formula is on every label. As it is identical in its composition with brain matter it is rapidly absorbed and relieves the depression from mental efforts, loss of memory, fatigue or mental irritability.

Sleeplessness, irritation, nervous exhaustion, inability to work or study is but BRAIN HUNGER, in urgent cases BRAIN STARVATION. It aids in the bodily and wonderfully in the mental development of children. It is a *vitali* phosphite, not a laboratory phosphate or soda water absurdity.

56 W. 25th St., N. Y. For sale by Druggists, or by Mail, \$1.

SCIENCE.—SUPPLEMENT.

FRIDAY, JUNE 24, 1887.

INDIAN CRADLES AND HEAD-FLATTENING.

I AM indebted to Dr. R. W. Shufeldt and Dr. Washington Matthews, both of the U. S. army, for the suggestion that a more intimate study of Indian cradles is demanded by those who are investigating the subject of cranial deformation.

In studying this subject, it is well to bear in mind the fact that among the Eskimos and Indians of the far north, as well as among the Indians of the tropics, cradle boards or frames are impracticable. In the former region the cold is too intense; in the latter, clothing of any kind is unnecessary. The student must remember, also, that the use of cradles extends over the first year of a child's life, beginning when it is absolutely helpless, and ending with the time when the child can stand alone in its cradle, and finally walk out of it. In all these cases, functionally if not structurally, the cradle is modified in harmony with its occupant. It must be remembered, also, that culture-gradus, natural supplies, and the appliances and decorations of each tribe, have an effect on the cradle. Properly speaking, cradles are divided structurally into quasi genera and species: they are intimately related to their environment, they have their ontogeny and phylogeny, and they are formed and fashioned in co-ordination with the whole industrial life of their respective tribes.

The parts of a cradle are, 1°, the frame; 2°, the bed; 3°, the pillow; 4°, the wrappings and lashings; 5°, the carrying appliances; 6°, the decoration.

The young Eskimo, when it goes abroad, finds its carriage in its mother's hood. This custom is universal from Labrador to Mount St. Elias, and the maternal *parka* is made capacious accordingly.

The Tinné stock of the Yukon River make their tray-shaped cradle of birch-bark, with hood and awning of the same material. No attempt is made at a permanent bed or pillow. The child in its wrappings is laid in the cradle, and lashed securely.

The national museum does not possess an Indian cradle from the Haida or Tlingit Indians. The Bella Bella Indians of British Columbia make a little ark of cedar-wood, with head-board sloping upward. The bed is an abundance of finely

shredded cedar-bark. The child is laid in this soft couch, wrapped with flaps of buckskin, and lashed in with a leather string. Totemic devices are painted on the head-board.

Coming southward, we encounter the Chinook cradle, a trough of cedar-wood, carved to imitate a scow-boat. The bed is soft bast or cedar-bark. The remarkable feature is the pad drawn down upon the forehead. Compare this with the awning of the Yukon cradle. Query: Did many Indian cradles formerly have a device to keep the heads of very small children from falling down while the cradle was in a vertical position, and did most tribes abandon it because it affected the shape of the child's head, while the Chinook retained it for the same reason? In scientific phrase, is this a case of survival or atavism?

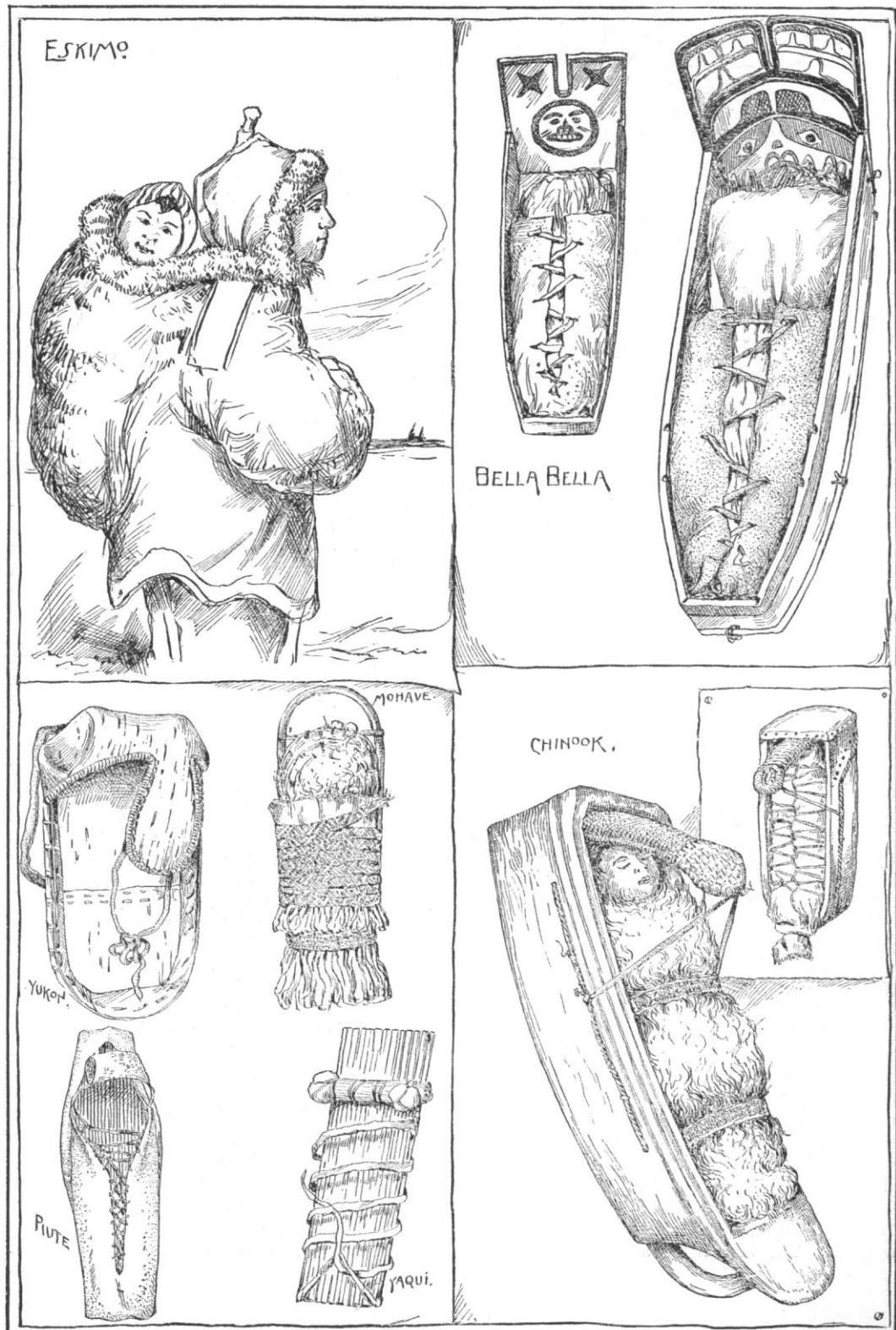
The Hupas and all other Oregonian and northern Californian tribes weave their cradle-baskets and wallets from twigs or from the tough fibre of the milk-weed. In shape, the frame resembles an open slipper, and a pretty dish-shaped awning covers the face.

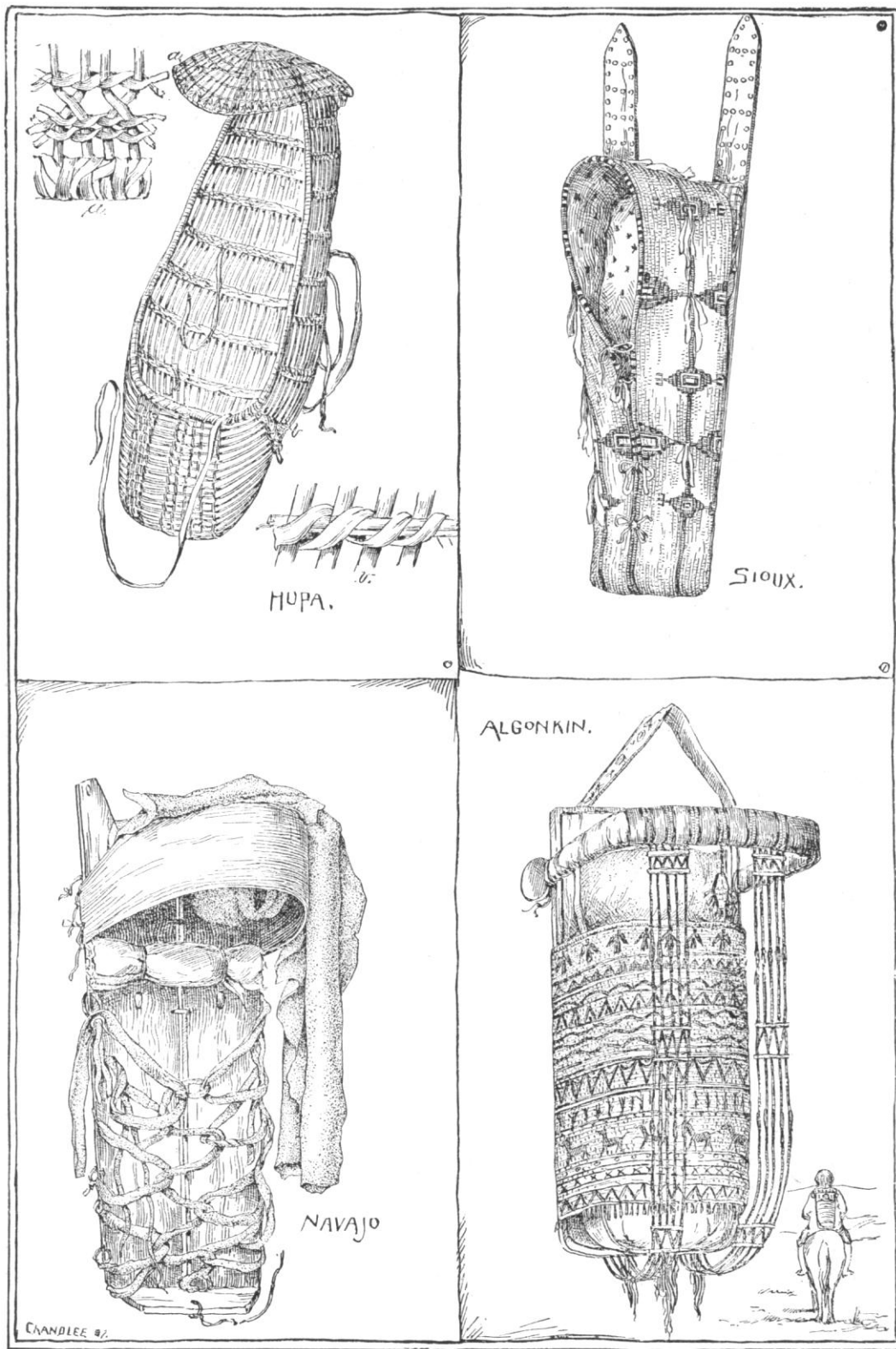
In southern California the Mohave and other members of the Yuma stock make a ladder or trellis, on which is laid a bed of shredded willow or mezquite bark. A blanket of the same material is spread over the baby, held in place, not by the almost universal lacing, but by a garter-shaped band wrapped round and round 'cradle and baby and all.' This band, in the specimen figured, is braided, not woven, of party-colored threads, the figures suggesting similar ornaments on pottery.

The Yaqui Indians of Sonora make their cradles of reed-canes, held in a plane by rude dowels piercing them transversely in several places. A bundle of split cane forms the pillow, and two little pads or bosses of rags keep the child's head from rolling off laterally. Yaqui crania should be carefully examined for occipital deformation.

The Piutes represent the great Shoshone stock of the interior basin. Their cradle is a rack of twigs, like that of the Yaqui. It is enclosed in a capsule of buckskin, has an awning over the head, and the bed is made of skins. The child's head has no elevated pillow, but is brought in contact with the fur-covered cradle-frame.

The Navajo cradle-board is the type followed by all the Pueblos and by the Apaches as well. A flat board, with awning, side-flaps, and elaborate lacing, forms the groundwork, which the gorgeous Navajo loads down with silver ornaments. Dr.





Shufeldt and Dr. Matthews have both studied this cradle carefully with reference to deformation.

The Sioux cradle represents those of all the tribes on the plains of the great west. It is a trellis or rack of four pieces, like a skid or a flower-frame, or a frame on which fur skins are stretched. Two upright pieces nearly contiguous at the foot are spread apart at the top. They are held in place by cross-slats above and below. A strip of buffalo-skin, fur side up, covers this frame. The child lies on this in a sort of hammock between the vertical slats. There is an ample pillow. The enclosing portion is shoe-shaped, made of leather, and strengthened around the face by stiff hide. The child is lashed in by the closing of these leather flaps, which are now for the most part gorgeously adorned with bead-work.

The Algonquin cradle is, like that of the Navajo, a board with stationary padded pillow, ample bed, and cover ornamented with porcupine-quills.

There are no cradles in the national museum from the southern Indians. The squaws that frequent southern cities at present carry their children in shawls or sacks on their backs.

No attempt is here made to touch the literature of the subject, which generally introduces more confusion than knowledge. O. T. MASON.

DR. BAIN ON ULTIMATE QUESTIONS OF PHILOSOPHY.

PROF. ALEXANDER BAIN of Aberdeen is universally regarded as the greatest exponent of the association school of psychology, and for this reason his scattered papers and addresses are carefully read by philosophical students. At the last meeting of the Aristotelian society, he read a paper on the 'Ultimate questions of philosophy,' which is reported as dealing with the philosophical differences of opinion that grow out of the attempts to give reasons for what has to be assumed as being ultimate. At the outset the author illustrated the position that a science may be very debatable in its foundations, and yet the superstructure raised upon these may be sound and unimpeachable. This is most apparent in the mathematical and physical sciences, in several of which the ultimate axioms are given in questionable forms, without impeding the development of truthful doctrines, both inductive and deductive. Less obvious is the application to logic and psychology, which, in the opinion of some, are in a state of total arrest until the fundamentals are thoroughly adjusted. Yet this extreme position may be overstated; for in these sciences many important results have been obtained, while con-

troversy still rages in regard to the primary truths of both. In following out the main design of the paper to deal with ultimate questions, the two foundation axioms of logic, namely, the axiom of self-consistency and the axiom of nature's uniformity, were first considered, the chief stress of the discussion being laid on the second. The absolutely ultimate character of the belief that the future will resemble the past was contrasted with the three other views of the axiom: namely, 1°, that it is an identical proposition (as maintained by Taine and Lewes); 2°, that it is an intuition; 3°, that it is a result of experience. As to the last view, which is the empirical doctrine, the author contended that experience could not assure us of what has not yet happened without making the assumption that the future will be as the past has been, that is, without begging the matter in dispute. The axiom is not properly described either by experience or by faith, and should be treated as unique, and should receive an unmeaning name, that compares it to nothing else. Considering that probably the earliest explicit statement of the axiom is that given in Newton's third rule of philosophizing, there would be no impropriety, but very much the reverse, in this bicentenary year of the 'Principia,' in baptizing it the 'Dictum of Newton.' The author then reviewed the several questions that might be regarded as ultimate in ethics, dwelling especially upon the proper view of disinterested action, which could not be obligatory without ceasing to be disinterested. Finally a search was made in psychology for the best examples of questions of the ultimate class.

ASYMMETRY.

DR. T. G. MORTON of Philadelphia has recently called attention, in the *Medical times* of that city, to the effects of unequal length of the lower limbs in producing lateral spinal curvature. Asymmetry of this kind has been known for some years, but it does not appear that it has been regarded as a cause of ailment in other parts of the body. Dr. Morton finds that it leads to backache of distressing severity, and also that it can be cured by adding to the shoe-heel of the short leg. The following is abstracted from his accounts of several cases: a young man, aged twenty-five, had been troubled for over a year with severe and continued backache, extending to the right side. When attempting to straighten up his back, he experienced a cramp-like feeling. It was found that his right leg was one and five-eighths inches shorter than the left, and that the right arm and leg were smaller than the left. The unsymmetrical form of the body was very apparent in a

back view, but was greatly reduced when the right foot was sufficiently propped up, as in the

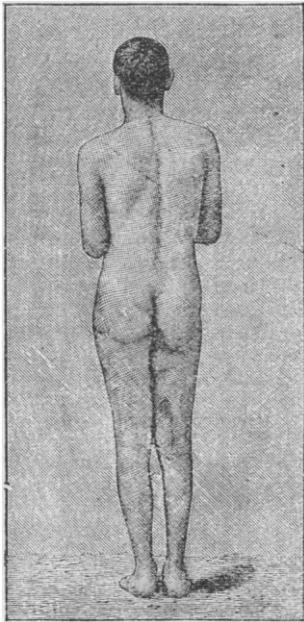


FIG. 1.

cuts. The right shoe was then corrected for the deficiency of the leg. With this change, the

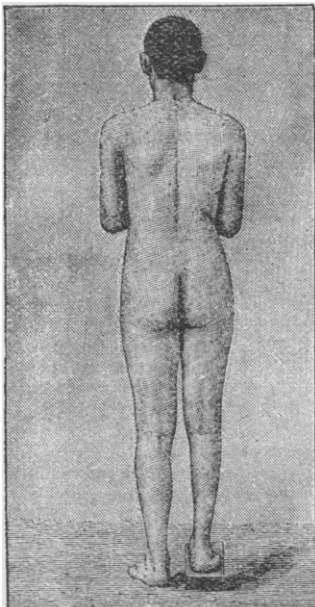


FIG. 2.

spinal deformity was nearly rectified, the patient was able to walk without lameness, and the pain in his back entirely disappeared.

EDUCATION IN URUGUAY.

A NOTE in the Journal of the society of arts calls attention to the fact that unusual attention has been given in Uruguay, within the last four or five years, to the education of the masses. The United States chargé d'affaires at Montevideo says that education is now absolved from any denominational inhibition; in fact, the public schools, now over fifty for primary classes, and over one hundred for second grade, besides three public high schools, are open alike to all religious denominations. Of what are termed rustic or rural schools, there are over 170; and the total number of scholars, in 1884, amounted to 27,000. Of private schools, there were 430, having an attendance of about 20,000 pupils. Rudimentary instruction of some sort is compulsory upon all children between the ages of six and fourteen. An educational institution of a peculiar sort has been established and greatly fostered by the government within the last few years. It is called *La escuela de artes y oficios*, and its principal aim is to afford to the poor boys of the republic an opportunity to learn different trades and professions at the expense of the government. It is conducted upon a military plan, and its expenses are borne by the ministry of war and marine. The education is altogether practical, and the rules and regulations well defined and understood, and these are strictly adhered to. An applicant for admission to this school must be of Uruguayan extraction, and over fourteen years of age at the time of entry. Vaccination is insisted upon. The applicant must be an orphan or his parents in indigent circumstances. His father, mother, or guardian must contract for him in writing that he is to remain for six years absolutely under the control of the principal of the school, with no interference from home or elsewhere. If taken ill, he must be sent to the hospital, and return to the school as soon as able. Military discipline of the strictest kind is observed. To show the proficiency of the institution, it is only necessary to state that the *Rivera*, a gunboat said to be powerfully built, was constructed entirely by the young workmen in this school, and launched by them. The minister of war and marine, in his last report, alluding to the institution, says that its progress and usefulness are felt more and more from day to day, and that, in addition to the *Rivera* constructed there, a small steamer, the *Pas y Trabagot*, has been built, and the steamers *General Palleja* and *General Garibaldi* are in course of construction at the school.

THE second volume of Appletons' 'Cyclopaedia of American biography' will be ready in a few weeks, and the third will appear in the autumn.

MILLER'S ESSENTIALS OF PERSPECTIVE.

In 'Essentials of perspective' Prof. L. W. Miller sets forth in a very attractive manner the principles of this study of representation which has grown to be such a bugbear among artists and draughtsmen.

In his method of treatment, the author has achieved considerable success; for, while pointing out and emphasizing all right principles, he has presented the subject in a purely objective manner, which renders it exceedingly agreeable to the student.

Recognizing Professor Ware of Columbia as a teacher, Professor Miller endeavors to present as much science as the artist ever has occasion to use; and, steering clear of technical treatment and purely theoretical discussion, leading principles are successively developed by the aid of cases of direct application to practical work.

The value of this method is agreeably shown in the chapter on horizons, where the subject is efficiently covered without reference to the geometrical analysis usually involved.

That portion devoted to curvilinear perspective is particularly interesting, from the graphic manner in which the bearings of this somewhat obscure branch are brought out.

The book will find its most valuable place with artists and architectural draughtsmen, and should do much to rescue the study of perspective from the neglect into which it has fallen.

LA TERRE DES MERVEILLES.

OUR western surveys have been the opportunity of numerous writers abroad. Foreign travellers are very susceptible to the attractions of our exceptional wonders, and devote themselves to Niagara, the Yosemite, the Yellowstone park, and the Colorado Cañon, much after the fashion of historians who write chiefly about kings and battles, and say little about the common people in the dull times of peace and prosperity. But it is still proper enough that great kings and decisive battles, or curious regions where nature has done, or, better yet, is still doing, her most wonderful and peculiar work, should take the most of our attention. This must be so as long as the diamond is prized as a gem. Mr. Leclercq, president of the Royal geographical society of Belgium, is therefore fully warranted in dividing the account of his travels in this country into three volumes; one telling of the trip from the Atlantic to the Rocky

Essentials of perspective. By L. W. MILLER. New York, Scribner. 12°.

La terre des merveilles. Par JULES LECLERCQ. Paris, Hachette. 8°.

Mountains, another given to an overland journey to Mexico, and a third devoted to the Yellowstone national park. The last is very neatly done. It is intelligently written, without undue excitement or exaggeration; it is well illustrated by good woodcuts drawn from photographs, and not from the imagination of the usual Parisian artist, who has so often given free rendering to his home-made conceptions of foreign lands. We should be fortunate if all travellers' stories were as well told.

LETTERS TO THE EDITOR.

[Continued from p. 616.]

Instinct in the cockroach.

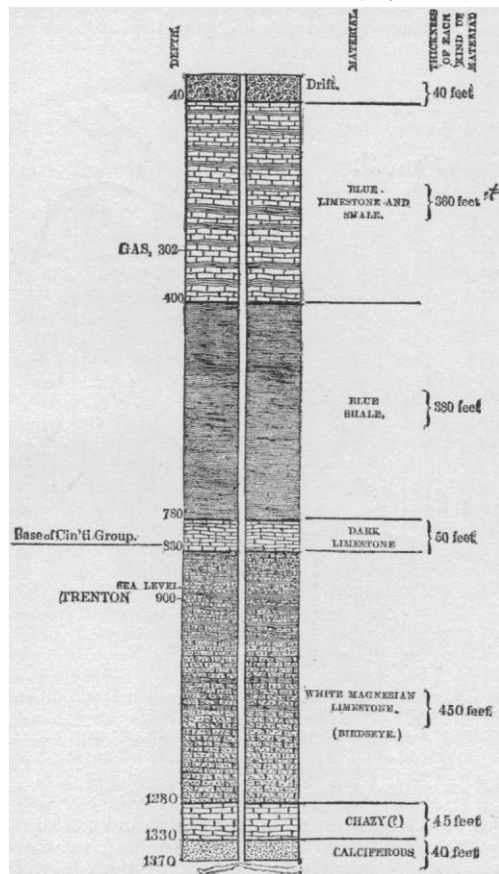
I WISH to bring before the notice of your readers the following curious instance of the operation of instinct in the cockroach (*Blatta*). During the hot months of the year, my laboratory is to some extent infested by these active insects, and I have been for several years observing their habits. At the distance of two feet above one of the benches, and fixed to the wall, is a double gas-bracket, the outer arm of which is seventeen inches long from the joint to the burner. On more than a dozen occasions, I have observed that a full-grown cockroach would climb up the gas-pipe and along the bracket towards the burner, but, finding the bracket a few inches from the flame too hot to traverse, would crawl back a few inches, wait a second or two, and then return towards the flame. If uninterfered with, he would, after a few trials, leave the bracket altogether, and return down the pipe, and run off at full speed. But I wished to see how he would act under peculiar circumstances. I therefore heated the bracket by the flame of a Bunsen lamp at a point fourteen inches from the tip and three inches from the joint, and waited. The insect, as usual, tried to leave the bracket by walking back towards the wall, but, finding his retreat cut off by the heated metal, became very much excited, and commenced running rapidly between the distal end of the bracket and the part which I had heated. After doing this several times, he selected the coolest part of the bracket, midway between the illuminating flame and the part heated by the Bunsen, crouched for a spring, and leaped on to the bench. He was running off rapidly, when I swept him from the bench, and crushed him on the floor with my boot. The insect deserved to escape, but I killed him because I wanted to observe the action of a fresh cockroach every time under the same circumstances. On more than a dozen occasions has the same performance been gone through. By many people such action would be accounted for by the mere word 'instinct,' but it seems to me singularly like the operation of reason. This is exactly what takes place when a fire occurs in a high building. The inmates (particularly women) jump wildly from the upper windows without waiting to see whether all other means of escape are exhausted — and get smashed on the pavement. Our friend 'the unspeakable Turk' says that women have no souls, and yet, although much higher in organization than the cockroach, they act, in similar circumstances, precisely in the same way.

GEORGE HAY, M.D.

Pittsburg, Penn., June 7.

Well drilled for gas at Oxford, O.

The accompanying cut represents a section of the strata passed through in a well recently bored in Oxford, O., for the purpose of finding oil or natural gas. A very full series of samples, eighty-seven in number, was saved as the drilling proceeded, and by their means it is possible to give an accurate account of the strata passed through. The drill penetrated the soil and drift to a depth of from forty to fifty feet. Immediately below, the bed-rock was struck. This consisted of layers of solid blue limestone, interstratified with beds of indurated clay or shale at various depths. The rock came up generally in



SECTION OF STRATA PENETRATED BY THE OXFORD GAS AND OIL COMPANY'S WELL.

small, angular fragments, often of the size of peas, sometimes larger, but always recognizable as the true blue limestone of the Cincinnati group. At a depth of 302 feet a small vein of gas was struck. When lighted, the flame was ten or twelve feet high, but it soon went out, accumulating in small quantities, and being lighted from time to time afterwards.

The limestone continued to the depth of 400 feet, and was succeeded by a bed of exceedingly compact, blue shale. This showed no change in character for 380 feet, and it seems to be the equivalent of the Eden shales of the Ohio geological survey. Below

this, and at a depth of about 780 feet, there was struck a stratum of hard, dark, almost black limestone, which was penetrated but slowly, the drill making only three feet in two and one-quarter hours. The fragments came to the surface very finely ground up, the pieces seldom as large as wheat-grains. This rock continued for a depth of fifty feet, and it marks the dividing-line between the Cincinnati group and the Trenton. This is the only stratum which can be referred to the Utica slate; and, if it is this, it is 250 feet less in thickness than at Findlay and other places.

The rock immediately below this stratum, reached at 830 feet, is a whitish limestone, evidently foreign to the surface of Ohio. It may be the equivalent of the bird's-eye limestone of New York, as certain specimens show the 'bird's-eye' feature with greater or less distinctness. The rock was much the same, whitish, and containing appreciable quantities of magnesia, down to 1,100 feet. Here it became darker, was more compact, and this continued to 1,280 feet, being alternately lighter and darker in bands. Below 1,280 feet there came another decided change. It was a change from very light to very dark limestone, coarser, with at times a greenish, then a bluish tinge. Some samples had a strong smell of oil, and this could also be readily seen floating on the water. It was also magnesian. This possibly represents the Chazy of New York. At 1,325 feet the drillings were coarse, blue and white, and argillaceous. At 1,330 it was a coarse white rock, but arenaceous; so much so, that the drillers said 'sand!' Each successive drilling, at 1,340, 1,345, 1,350, 1,355, 1,360, 1,365, was finer than before; and when the last depth had been reached, and the drill was withdrawn for pumping, the rope showed the presence of water in what had previously been a dry hole. Soon a strong smell of sulphuretted hydrogen told the story that sulphur-water had been struck, and the drilling was at an end. The last forty feet passed through is in all likelihood the upper portion of the calciferous sand-rock of New York.

The following table represents the formations passed through in the well, with their respective thicknesses:—

Drift.....	40 feet.
Cincinnati group.....	790 "
Trenton.....	495 "
Calciferous.....	40 "

Total..... 1,365 feet.

Jos. F. JAMES.

Oxford, O., June 6.

Another muscle in birds of taxonomic value.

Whatever laborers in ornithotomy in past times may have done, it is certainly chiefly due to the late and talented British anatomist, Garrod, that certain muscles, and groups of muscles, found to be present or absent in natural divisions of birds, were pressed into service with telling effect in the taxonomy of the class.

There are three principal muscles in the pectoral limb of a bird, or rather in one that possesses them all, which Garrod, by dwelling upon their modifications, their constancy, their various modes of origin and insertion, throughout the group, brought into classificatory play: these are the tensor patagii longus, the tensor patagii brevis, and the 'bicipital slip to the patagium.' He referred to no others especially, in this patagial region, and these three are now sufficiently well known to anatomists to ob-

viate the necessity of my further alluding to them here.

Among my manuscripts in the hands of publishers, I have some very extensive work upon the myology of birds, illustrated by nearly a hundred original drawings; and, as many of my friends are aware, I have been engaged for a number of months past upon my second contribution to the anatomy of the Macrochires, a work now drawing towards completion. Quite recently, while investigating the muscular system of the Hirundinidae, in this latter connection, I discovered, in the course of my dissections, a muscle for which at this moment I recall no published description, and one the importance of which Garrod, even if he knew of its existence, certainly overlooked. When present, its chief carneous por-

delicate tendon, runs along within the free marginal fold of the patagium of the wing, in common with the tendon of the tensor patagii longus, to blend with it just before arriving at the carpal joint.

Garrod chose the wing of *Ramphastos cuvieri* to illustrate the arrangement of the patagial muscles in the Passeres, but not a hint of this one is given; while in the figure (*Icterus vulgaris*) next to it a tendinal slip is shown cut short, of which he says nothing, but which evidently belongs to this muscle. Nowhere else is this shown or alluded to in his work.

I propose to call this muscle the 'dermo-tensor patagii,' it being partially connected with the integumentary system of muscles in the birds wherein I have thus far found it.

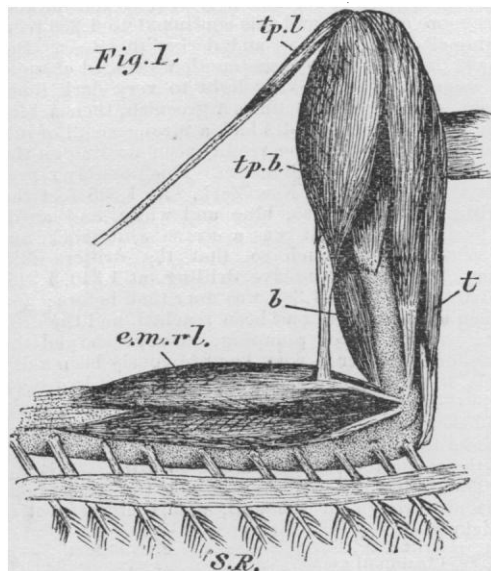


FIG. 1. — VIEW, FROM THE OUTER SIDE, OF THE MUSCLES OF THE PATAGIUM OF THE LEFT WING OF A PASSERINE BIRD, *RAMPHASTOS CUVIERI* (AFTER GARROD, AND SLIGHTLY REDUCED FROM ORIGINAL).

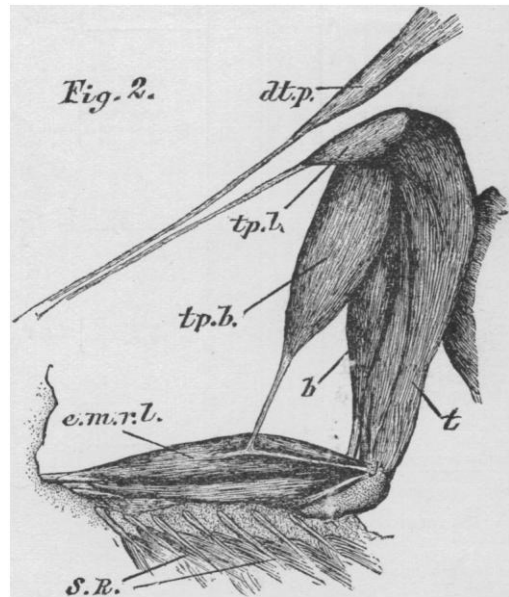


FIG. 2. — SAME VIEW, AND CORRESPONDING PARTS OF THE SAME WING OF A PASSERINE BIRD, *PROGNE SUBIS* (BY THE PRESENT WRITER).

tp. l., tensor patagii longus; *tp. b.*, tensor patagii brevis; *dt. p.*, dermo-tensor patagii; *e. m. r. l.*, extensor metacarpi radialis longus; *t.*, triceps; *b.*, biceps; *S. R.*, secondary remiges (fig. 2 nearly $\times 2$).

tion occurs in the free marginal fold of that triangular duplicature of the common integuments found between the root of the neck and the tip of the shoulder in birds. It first came to my notice in a specimen of *Progne subis*, whereupon I at once dissected a number of other individuals of the same species; and I found it equally well developed in all of them.

This muscle, in part, is a dermal muscle, and arises from the integuments on the anterior aspect of the neck at about its lower third; at its origin its fibres spread out fan-fashion, their terminal fibres meeting those of the muscle of the opposite side in the median line. Here it is quite adherent to the skin, but its fibres rapidly converge as they pass in the direction of the shoulder-joint, opposite which region they gradually free themselves from the skin to form a small fusiform muscle, which, ending in a

Upon dissection, I find it present in each and all of the other United States Hirundinidae; in all true passerine birds, including *Ampelis*; but absent in the *Caprimulgi*, in the *Trochili*, in the *Cypseli*, and, if we may judge for all the typical *Passeres mesomyodi* from the condition in *Tyrannus tyrannus*, it is also wholly absent in them. Further than this, I have not investigated the matter, as my work on the *Macrochires* prevents; but it will be highly interesting, to say nothing of its importance, to look up the subject for other groups of birds. Its importance at once becomes evident by finding it in such a form as *Ampelis*, showing by this character, at least, the passerine affinities of this bird over its clamatorial ones, which latter have been more than once suspected, at different times, as predominating in its organization.

R. W. SHUFELDT.

Fort Wingate, N. Mex., May 24.

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